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Sub B1 A1

1. In a chemical mechanical planarization system that includes a Cu/Ta/TaN surface, a replacement single-step etching solution comprising:

a) an oxidizing reactant selected from the group consisting of H_2O_2, HNO_3 and mixtures thereof; and

b) a co-reactant is selected from the group consisting of H_3PO_4, H_2SO_4, HNO_3, oxalic acid, acetic acid, organic acids and mixtures thereof.

Sub B2 A2

12. The etching solution of, claim 1 further comprising abrasive particles selected from the group consisting SiO_2, Al_2O_3 metallic and solid elemental particles, polymer particles, oxides, carbides, fluorides, carbonates, borides, nitrides, hydroxides of Al, Ag, Au, Ca, Ce, Cr, Cu, Fe, Gd, Ge, La, In, Hf, Mn, Ng, Ni, Nd, Pb, Pt, P, Sb, Sc, Sn, Tb, Ti, Ta, Th, Y, W, Zn, Zr, and mixtures thereof.

Sub B3

13. An etching solution as in claim 12 wherein said abrasive particles are coated.

14. An etching solution as in claim 13 wherein said coating is a chemically active species.

15. An etching solution as in claim 12 wherein said coating is CeO_2.

16. An etching solution as in claim 12 wherein said particles are produced by the sol method.

17. An etching solution as in claim 12 wherein said particles have a range of sizes from approximately 4 nanometers to approximately 5 micrometers.

18. An etching solution as in claim 12 wherein said particles have a size less than approximately 5 micrometers.

Sub B4 A3

19. A method of accomplishing chemical mechanical planarization of a Cu/Ta/TaN surface comprising:

providing an etching solution including a combination selected from the group consisting of (i) H_2O_2 with H_3PO_4, H_2SO_4, HNO_3, oxalic acid, acetic acid, or organic acid; (ii) HNO_3 with H_3PO_4, or H_2SO_4; and (iii) an oxidizing reagent with HF;

applying the solution to the surface; and

planarizing both the Cu and at least one of the Ta and TaN during a single processing step.

20. The method of claim 19, wherein the etching solution is selected from the group consisting of H_2O_2 with H_3PO_4, H_2SO_4, HNO_3, oxalic acid, or organic acid.

21. The method of claim 19, wherein the etching solution is selected from the group consisting of HNO_3 with H_3PO_4, or H_2SO_4.

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22. The method of claim 19, wherein the etching solution is selected from the group consisting of an oxidizing reagent with HF.

23. The method of claim 19, further including in the etching solution an additive selected from the group consisting of selected from the group consisting of HCI, aliphatic alcohols, butylated hydroxytoluene, Agidol-2,2,6-di-tert-butyl-4[(dimethylamino)methyl] phenol, 2,6-di-tert-4N,N-dimethylaminomethylphenol, borax, ethylene glycol, $ZnSO_4$, methanol, propanol, poly(oxyethylene)lauryl ether, malic acid, $HOOC(CX_2)_nCOOH$ wherein X=OH, amine, H and n=1-4), 3% tartaric acid, 1% ethylene glycol, 1,2,4-triazole, 1,2,3-triazole, tetrazole, nonionic surfactant, ethanol, triflouroethanol, SiF6, organic salt surfactant, polyvinyl alcohol, diphenylsulfamic acid, sodium oxalate, bezotriazole, sodium lignosulfonate, glycol, gelatin carboxymethylcellulose, amines, heavy metal salts, salts of Cu and Ta, KCl, $CuCl_2$, $SnCl_2$, propylene glycol, 2-ethyl-hexylamine, copper carbonate, low molecular weight alcohols, glycols, phenols, aliphatic alcohols, polyvinylalcohols, anionic surfactants, cationic surfactants, fluorocarbon-based surfactants, nonionic surfactants having the properties of preferentially adhering to certain materials, modifying thereby the chemical reactivity where so adhered, polyvinyl alcohol

solution stabilizers and species inhibiting spontaneous decomposition of oxidizing agents, wetting agents and mixtures thereof.

24. The method of claim 19, further including in the etching solution at least one of CuCl, FeCl, and $FeCl_3$, in the etching solution.

25. The method of claim 19, further including in the etching solution at least one of $Cu(NO_3)_2$, $CuSO_4$, EDTA, $FeNO_3$, KOH, $K_2S_2O_5$, $(NH_4)_2S_2O_8$, $CuNH_4Cl_3$, NaOH, $NaClO_3$, $NaNO_3$, $Na_2S_2O_8$, NH_4F, and NH_4OH and in the etching solution.

26. The method of claim 19, further including in the etching solution at least one of a molybdenum salt and phenolsulfonic acid in the etching solution.

27. The method of claim 19, further comprising including abrasive particles selected from the group consisting SiO_2, Al_2O_3 metallic and solid elemental particles, polymer particles, oxides, carbides, fluorides, carbonates, borides, nitrides, hydroxides of Al, Ag, Au, Ca, Ce, Cr, Cu, Fe, Gd, Ge, La, In, Hf, Mn, Ng, Ni, Nd, Pb, Pt, P, Sb, Sc, Sn, Tb, Ti, Ta, Th, Y, W, Zn, Zr, and mixtures thereof.

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28. The method of claim 19, wherein the step of planarizing removes the Cu and at least one of the Ta and TaN with approximately 1:1 selectivity.

29. The etching solution of claim 1 comprising H_2O_2.

30. The etching solution of claim 1 comprising H_3PO_4.

31. The etching solution of claim 1 comprising H_2SO_4.

32. The etching solution of claim 1 comprising HNO_3.

33. The etching solution of claim 1 comprising an organic acid.